Chapter 1 Driving the Roads

Chapter Challenge

20 - Relationships among Braking distance, following distance, + total stopping distance

20 - Factors that affect each of these

20 - connections among speed, friction, and radius of the curve when turning

10pts 2-3 min long <2 min -5pt >5mn -5pt

model
video

15 → writing

15 creativity

Charts
graphs
tables
skit

power point
prezi
poster
pamphlets

Ch1.3 Average Speed: following distance and Models of motion

8/30/12

WDYS Bunny watching, Boat in water, Dog in car and wind blowing ears, Dog's car is speeding & hits car in front which hits car ahead, Blue car driver not paying attn, crying child in blue car, mile marker, minivan & convertible have good following distance, fast moving + lady's hair blown back

WDYT Safe following distance

1 car length per 10 mph

depends on traffic (speed)

depends on car you're driving

reaction time

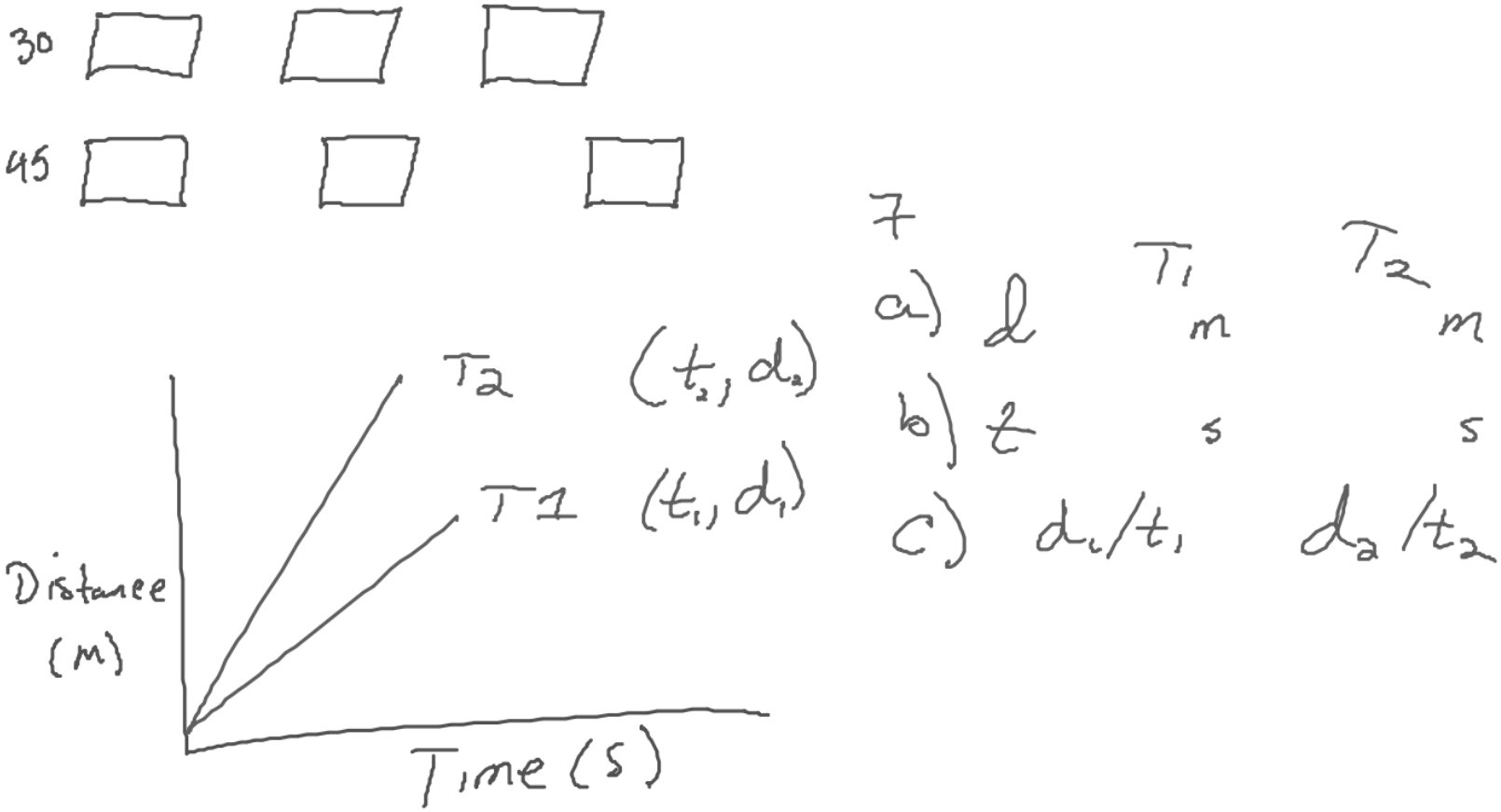
weather

distractions

car size

car condition

tires



9/6/12 Do this by 1:30.

Finish Investigate parts 7 & 8.

Set up 2-column notes for Physics Talk.

Speed

How fast something moves.

Constant speed

Speed that doesn't change over time.

Average speed

Total distance divided by total time

$$v_{av} = \frac{\Delta d}{\Delta t} = \overline{v}$$

distance

meter m {mi, km, ft, in, cm, mm

time

second s {h, min, d, mo, y

Velocity

$$v = \frac{d(m)}{t(s)}$$

$v\left(\frac{m}{s}\right)$

velocity

instantaneous speed

speed equation

Calculations & units

speed with direction

09/10/12

the speed given at any moment

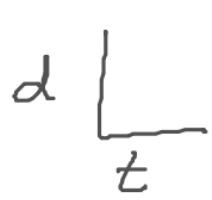
$v_{av} = \frac{\Delta d}{\Delta t}$ $\Delta d = v_{av} \Delta t$

$\Delta t = \frac{\Delta d}{v_{av}}$

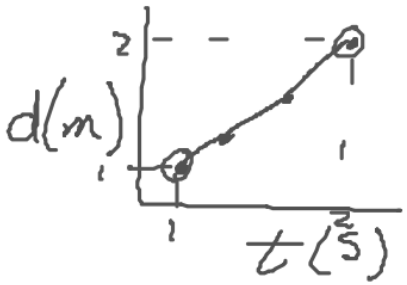
pay close attention to your units

Check to make sure your units make sense

Speed from a graph



$\frac{\text{rise}}{\text{run}} = \frac{\Delta d}{\Delta t} = \text{speed}$



$\frac{d_2 - d_1}{t_2 - t_1} = v_{av}$

kilometer
mile

1000 m 0.62 mi

5280 ft

9/11/12

doppler effect

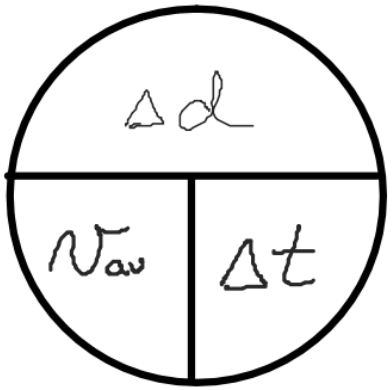
pitch changes higher as something approaches & lower as something recedes

reaction distance

the distance your car travels from when you notice until you react, it increases as your speed increases

WDYTN

p. 48 nothing new



EQ

Physics to Go pp. 49-51 #4, 5, 6, 7, 12

$1\ h = 60\ min$

$1\ min = 60\ s$

$1\ mi = 5280\ ft$

$1\ ft = 12\ in$

$55\ \frac{mi}{h} \cdot \frac{1\ h}{60\ min} \cdot \frac{1\ min}{60\ s}\ \frac{mi}{s}$

$\frac{mi}{s} \times .55 = mi \times \frac{5280\ ft}{mi}$

$= ft$

Section 4: Graphing Motion: Distance, Velocity, and Motion 9/13/12

WDYS Guy speeding in red car, hat flying off, doing a wheelie
Pedestrian running w/dog
Lady in yellow car was stopped for ped.
Water + mtns in background, fire hydrant, bldgs

started off too fast

WDYT 0 → 30 mph bus + car

Similar
Move forward
Start from 0 mph
stop getting faster @ 30 mph
wheels roll
start slow + get faster

different
car accelerate faster
bus takes longer to get to speed
bus must release air brakes

Car	bus
quicker	turtle-ish
responsive	tedious
	lumbering

@ 0.4s slope (0.12, 0) (0.6, 1.22)

$$\frac{1.22-0}{0.60-0.12} = \frac{1.22}{0.48} = 2.54\ \frac{m}{s}$$

Work up through 9a

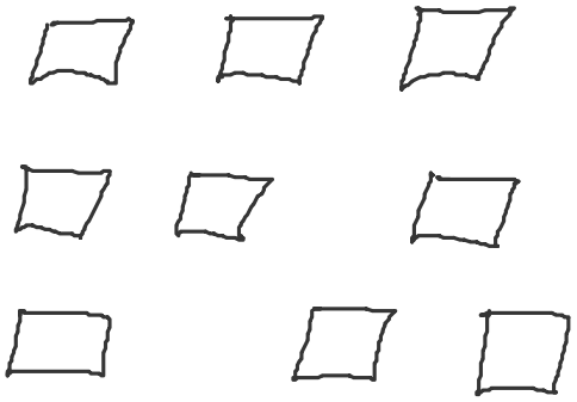
Read #10

Do # 11 (b-d) using our v-t graph

9/20/12

Take 5 minutes to read Physics Talk pp. 58-59

Velocity	how fast an object is going in one direction
acceleration	Change in velocity over time - change direction and/or - change speed
positive acc.	increase in velocity (speed up)
negative acc.	decrease in velocity (slow down)
Vector	has both magnitude and direction
Scalar	has only magnitude



not accelerating

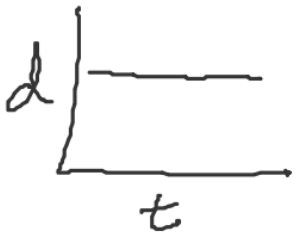
positive acceleration

negative acceleration

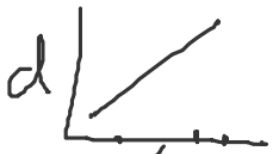
$$a = \frac{\Delta v \left(\frac{m}{s}\right)}{\Delta t \ (s)} \quad m/s/s \quad m/s^2$$

mass (kg) distance (m)

time (s) velocity $\left(\frac{m}{s}\right)$

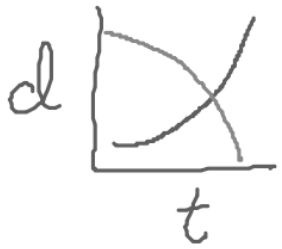


slope = 0, velocity = 0
no Δv means no acc.

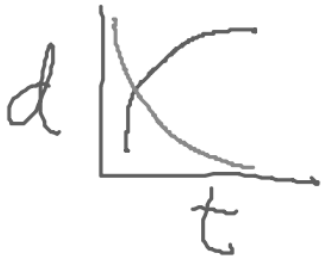


1.5cm 7cm
3cm 8.5cm
Δ 1.5cm Δ 1.5cm

constant slope (constant velocity)
means no acc.



upward curve = positive acc.
while moving away
while moving towards



negative acc.
while moving away
while moving towards

Checking Up p. 64 #1-3

9/24/12

WDYTN? p. 66

EQ What? How? Why? Why should you care? p. 67

Physics to Go pp. 68-71 #7, 9, 17

9/24/12

Group 1	Group 2	Group 3	Group 4
Mia	Alexandra	Rachelle	Gabby
Lindsay	Marina	Brittany	Rubi
Azusena	Stacey	Meghan	Vicky
Sandra	Daisy	Cinthia	Alejandra L.
Shelby	Taylor	Elizabeth	Alejandra R.
Izamar			Zuleima

Chapter 1 Mini-challenge pp. 72-74

9/25/12

1:05 - 1:45

Section 5 Negative Acceleration: 9/25/12
Braking Your Automobile p. 75

WDYS Red car stops to not hit the moose, driving crazy fast
large (quick) negative acceleration to rest
car rocked forward, tires skid, smoke from friction
big moose would cause damage to car + driver
driver lacked proper reaction time

WDYT distance between you + animal
Speed
tires / brakes condition
road surface
weather - precipitation, temperature
traffic
vehicle weight

night blindness
depth perception
reaction time
} driver

} condition

9/27/12

Group 1	Group 2	Group 3	Group 4
Mia	Alexandra	Rachelle	Gabby
Lindsay	Marina	Brittany	Rubi
Azusena	Stacey	Meghan	Vicky
Sandra	Daisy	Cinthia	Alejandra L.
Shelby	Taylor	Elizabeth	Alejandra R.
Izamar			Zuleima

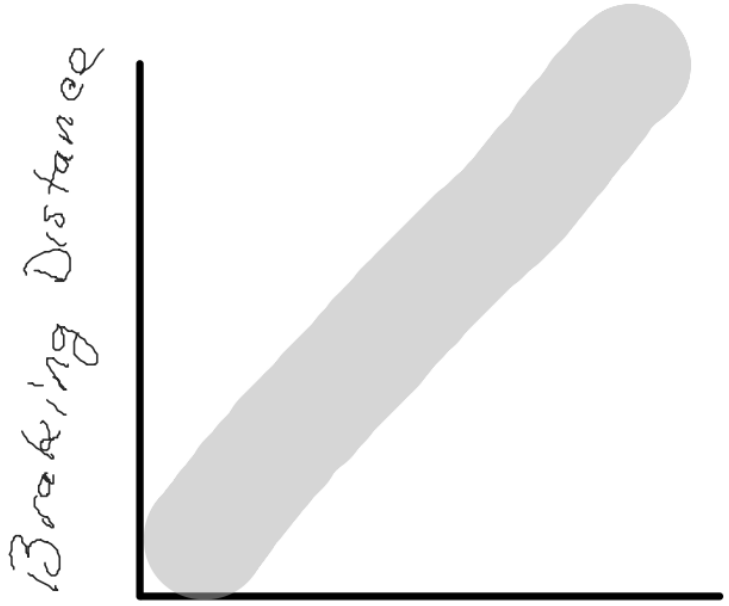
In your groups, complete the Investigate pp. 75-77.

You will need to hold the Bee-Spi (detector) by hand.

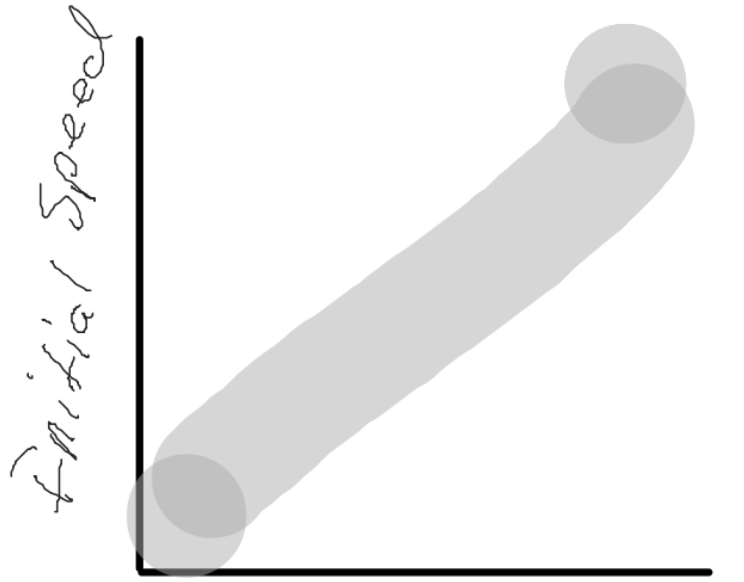
10/1/12

Finish p. 77 Investigate #5-8

Read Physics Talk pp. 78-80



Initial speed



Braking Distance

Horizontal -

Braking distance

how far you go until you stop from when you started braking

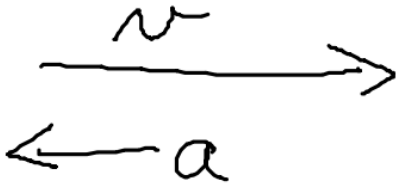
acceleration

increasing speed = positive

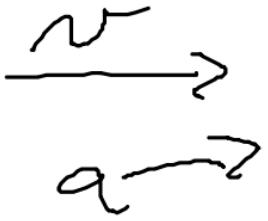
decreasing speed = negative

$$a = \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{t_f - t_i}$$

$$a = \frac{0 - 4.82}{4 - 0} = \frac{-4.82}{4} = 1.21$$



Slowing down



Speed up

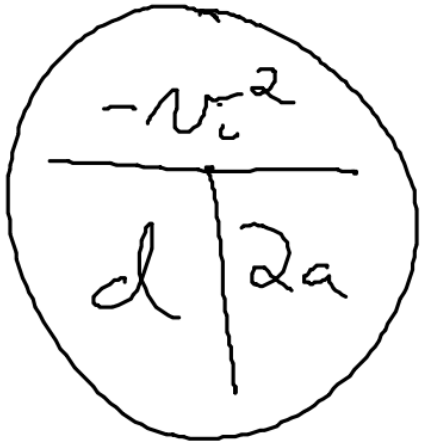
Calculating braking distance

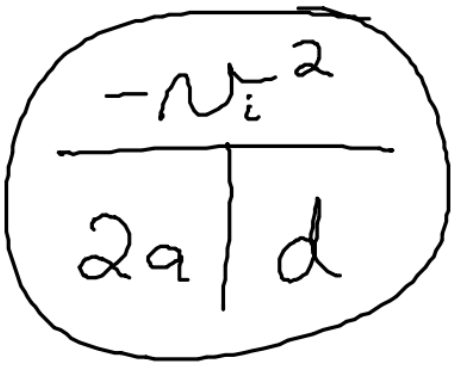
$$v_f^2 = 2ad + v_i^2$$

$$2ad = v_f^2 - v_i^2$$

$$d = \frac{v_f^2 - v_i^2}{2a} = \frac{-v_i^2}{2a}$$

$$d = \frac{-v_i^2}{2a}$$





$v_i = 7.48 \text{ km/h}$

$d = 2.65 \text{ m}$

$$7.48 \frac{\text{km}}{\text{h}} \times 1000 \frac{\text{m}}{\text{km}} = 7480 \frac{\text{m}}{\text{h}}$$

$$7480 \frac{\text{m}}{\text{h}} \times \frac{1 \text{ h}}{60 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ s}} = 2.07 \frac{\text{m}}{\text{s}}$$

$$2a = \frac{-\left(2.07 \frac{\text{m}}{\text{s}}\right)^2}{2.65 \text{ m}} = -1.62 \frac{\frac{\text{m}^2}{\text{s}^2}}{\text{m}} = -1.62 \frac{\text{m}}{\text{s}^2}$$

$$2a = -1.62 \frac{\text{m}}{\text{s}^2}$$

$$a = -0.81 \frac{\text{m}}{\text{s}^2}$$

10/02/12

Checking Up p. 82 #1-3

WDYTN p. 86

Essential Questions p. 87

Physics to Go pp. 88-89 #2, 11

$\frac{-v_i^2}{2a|d}$ $d = \frac{-v_i^2}{2a}$

10/04/12

1:05-1:25 Finish Section 5 EQ & PtG

1:25-1:55 Section 6 (next screen)

1:55-2:25 Section 7 WDYS & WDYT

Section 6 Using Models: Intersections with a Yellow Light

10/04/12

Read Physics Talk pp. 98-100 as a group.
Answer Checking Up p. 100 #2-4.

Section 7 Centripetal Force: Driving on Curves p. 105 10/04/12

WDYS Speeding car on a narrow mtn. road + nearly tipping over, off track going around a corner, car is accelerating, nearly crashing traffic sign warning of curves ahead too fast for the road

WDYT Why a sign?
To warn of danger which might cause physical harm

How to find speed?
Measure width, slope, location, circumference of curve + pavement

Chapter 1 Section 7 Centripetal Force

There are four sections of the Investigate you must complete: Toy car (1-3), Turntable (4-9), Chair (10), and Ball (11-13). There is only one chair and only one turntable so teams must rotate through the stations. The turntable will take the longest to complete. Please read and follow directions carefully. During the ball station, use a curved ramp in place of a newspaper.

10/9/12 Complete the Investigate

force	a pull or push
Newton's first law of motion	An object in motion will stay in motion at a constant speed unless a force acts on it, also applies to an object at rest
Centripetal force	a force that keeps objects moving in a circle
Centripetal acceleration	acceleration due to changing direction

10/11/12

Checking up p.110 #1-3, 6
WDYTN? p. 112
EQ p. 113
PtG p. 114-115 #3, 4, 7, 9, 12, 13

10/15

Finish the above list, plan your presentation for Thursday

10/16

Plan your presentation for Thursday, study for the test on Thursday

10/18

Presentation, Chapter Test

10/16

Plan your presentation for Thursday (use checklist)
Study for the test on Thursday

10/18

Presentation, Chapter Test

Study:

Average speed, a=v/t, v=d/t, positive and negative acceleration, acceleration & velocity and slopes on graphs, response time, centripetal acceleration